REMARKS

This is in response to the Office Action dated November 25, 2002. Reconsideration is respectfully requested.

Affirmation of Election in Response to Restriction Requirement

Applicant hereby affirms election of Group I, Claims 1-4, 14-20 and 24-29, and acknowledges withdrawal of Claims 21-23. Applicant respectfully traverses the restriction, noting that one of the two criteria necessary for restriction requires that, "There must be a serious burden on the examiner if restriction is required". (MPEP, Section 803.01, Page 800-4.) In view of this requirement, applicant requests that the Examiner reevaluate his decision requiring restriction, as there should not be a serious burden either for searching or evaluating the publications located in the search for both the article, method and system claims in the application, since all of the claims involve the same invention and are, therefore, closely related in subject and scope.

Summary of Claim Rejections

Claims 1-4, 14-20 and 24-29 are pending and all are rejected. Claims 18-20 and 27-29 are rejected under 35 USC 112 as being based on a non-enabling disclosure. Claims 1-4, 14-20 and 24-29 are rejected under 35 USC 112 as being indefinite, the Examiner listing various issues concerning claim language. Claims 1-4, 16 and 24-26 are rejected as anticipated by U.S. Patent No. 4,287,245 to Kikuchi. Claims 14, 15, 17, 18 and 27-29 are rejected as obvious over Kikuchi alone or over Kikuchi in view of U.K. Patent Application GB 2 296 749 to Villain et al.

Applicant respectfully traverses the rejections and presents arguments below which demonstrate, on a claim-by-claim basis, that the claims as amended are allowable over the cited references.

Summary of the Invention

Applicant's invention concerns a pre-formed insulation module suitable for a broad range of insulating applications and especially useful for insulating process components such as pipes and fittings in cryogenic industrial settings. The pre-formed insulation module according to the invention has opposed longitudinally extending contact surfaces and terminal contact surfaces and comprises at least one inner insulation layer having thermal shock characteristics, at least one outer insulation layer disposes radially outwardly from the inner layer, at least one water vapor barrier and a cladding layer. The longitudinally extending contact surfaces include a portion formed by a portion of at least one of the first and second insulation layers.

The Argument

Applicant provides below, on a claim-by-claim basis, arguments against the various rejections of the pending claims.

Claim Rejections under 35 USC 112

Claims 18-20 and 27-30 are rejected as based upon a non-enabling disclosure. These claims recite expansion joints in the insulation module. Applicant respectfully disputes the characterization of the disclosure as non-enabling with respect to these claims. Page 4, lines 28-32 and page 5, lines 1 and 2, provide the following description of the expansion joints:

> The insulation layers must be fabricated having regard to stress profile. Thermally induces stresses will exist in both the longitudinal and radial directions of the insulation module and effective insulation must accommodate this. To this end, internal contraction/expansion joints may be formed along the length of the module and, optionally and advantageously, terminal contraction/expansion joints are formed at each of its ends in the terminal contacting surfaces.

Further detailed description of the expansion joints is provided at page 12, lines 26-32, with reference to the application figures:

> Each foam insulation layer 314, 316a, 316b incorporates at least one suitable contraction/expansion joint 370 designed and arranged to accommodate expansion/contraction along the portion of pipe insulated with the insulation modules 310 and 320. It will be noted that each contraction/expansion joint 370 is staggered in longitudinal and circumferential location relative to another. This arrangement is used to allow secure jointing and minimum risk of water vapour ingress.

These descriptions would clearly enable one of ordinary skill in the art to make and use an insulation module having expansion/contractions joints as recited in Claims 18 and 27-29. The disclosure expressly states and shows in various of the figures that the expansion/contraction joints are joints in various of the insulation layers and are positioned along the length of the module to accommodate the expansion and contraction of the component as it is heated and cooled. This is a fundamental concept well understood by those of ordinary skill in the art, as admitted by the Examiner, who has characterized the concept as "old and well known" on page 6 of

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the Action. Because the concept is "old and well known", the extensive explanation provided in the application and quoted above should be more than sufficient to enable one of ordinary skill in the art to make applicant's invention. Applicant respectfully contends that the disclosure is expressly enabling in view of the cited passages and believes that no further explanation is needed or appropriate. Applicant respectfully requests that the Examiner explain more precisely the perceived deficiencies of the cited passages above regarding enablement or withdraw the rejection of Claims 18 and 27-29.

The recess recited in Claim 19 as comprising the expansion/contraction joint is described in detail at page 10, lines 5-17, reproduced below.

> Foam insulation layer, 316 incorporates at least one suitable internal contraction/expansion joint 370 formed along the length of modules 310 and 320. Joint 370 may take the form of a part-cylindrical recess, occupied by a suitable flexible material part-circular, actually semi-circular, pre-form part 372 such as polyimide foam as above described, designed and arranged to accommodate expansion/contraction of the insulation layer 316 of modules 310 and 320. Part 372 neatly fits the recess of joint 370. As most contraction behaviour is observed inwardly of about one third of the distance from the insulation module 310 surface to the component surface, the contraction/expansion joint 370 need not extend to the surface. It terminates at a suitably located terminal end 371. Contraction/expansion joints, 334, 335 and 380 may also be formed at each end of module 310 and 320 in the terminal contacting surfaces 337 and 387.

The cited passage also describes and identifies the expansion/contraction joints formed in the terminal contacting surfaces at each end of the module as recited in Claim 20. The joint is shown in Figure 9, which is described on page 8, lines 2 and 3, as follows: "Figure 9 is an end view of one end of the preform fo Figure 8 following cutting of an end contraction/expansion joint". The expansion joint in the terminal contacting surface at the end of the modules is further described with reference to the figures on page 10 at line 28 through page 11, line 3, as follows.

> At each end of the insulation module 310 and 320, foam insulation layers 314 and 316 are fabricated with circumferential joints 330, 334 cut in the terminal contacting surfaces 337 and 387 as shown in Figures 1 to 7. At one first end, circular section grooves 335 and 380 are cut into terminal contacting surface 387 to form tongue portion 330. At the other end, circular section groove 334 is cut into terminal contacting surface 337 to form a complementary connection means to tongue portion 330 of an adjacent module (as seen in Figures 5 and 6).

Applicant respectfully contends that the disclosure is fully enabling for Claims 18-20 and 27-29 in view of the figures and extensive descriptions quoted at length directly from the application. Applicant requests that the rejection of Claims 18-20 and 27-29 as based on a non-enabling disclosure be withdrawn in view of the arguments presented above.

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Claims 1, 2, 4, 16 and 24-26 have been specifically rejected by the Examiner under 35 USC 112 as indefinite.

Claim 1 has been amended to eliminate the term "suitable" which the Examiner finds objectionable. Claim 1 now recites an insulation module having at least one first inner

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insulation layer having a capacity to withstand thermal shock under cryogenic conditions. This is well understood by those of ordinary skill in the art and is explained on page 8, lines 19-22, by way of example, as the capability to accommodate thermal stresses induced by a temperature differential between 200°C and 250°C between the interior of the insulated component and the ambient. These numbers are provided by way of example only and are not meant to define absolute limits, rather they qualitatively define the harsh thermal environment which the first inner insulation layer must be capable of withstanding according to the invention. This is what is meant by "having the capacity to withstand thermal shock under cryogenic conditions" as recited in Claim 1, i.e., the ability to withstand the stresses induced by large temperature gradients as defined in the application on page 8. There is no ambiguity as to Claim 1. As supported by the cited portions of the description, it is clear that Claim 1 particularly points out and distinctly claims the subject matter regarded as the invention as required under 35 USC 112. Applicant respectfully requests that the rejection of Claim 1 as indefinite be withdrawn.

Applicant has amended Claims 2 and 4 as suggested by the Examiner, thus, these claims should now be allowable with respect to 35 USC 112.

Claims 16 and 24-26 have been amended to recite that the various insulating layers have thermal shock characteristics different from one another. An example of the embodiment recited in these claims is provided on page 8, lines 23-32, and on page 9, lines 1-5, which describes an insulating module according to the invention having a first inner insulation layer 314 made of a flexible polyimide foam which has excellent thermal shock characteristics in that it can withstand large temperature gradients without becoming

embrittled and cracking, and a second outer insulation layer 316 formed from a different material such as polyurethane or polyisocyanurate foam. These are different materials having different properties as recited in the claims. The reasoning behind the difference is that the outer layers of insulation do not experience the same large temperature gradients as the layer or layers closest to the item being cooled or heated and thus the same properties are not needed in the outer layers as may be required in the inner layers. Applicant contends that there is nothing indefinite or vague about the claim terminology found in Claims 16 and 24-26 as evidenced in this simple and straightforward example found expressly in the application. Applicant therefore requests that the rejection of these claims under 35 USC 112 as indefinite be withdrawn.

Rejections under 35 USC 102

Claims 1-4, 16 and 24-26 are rejected under 35 USC 102(b) as anticipated by Kikuchi. However, to anticipate a claim, the reference must teach every element of the claim (MPEP, Section 2131, Page 2100-69). Claim 1 as amended recites a pre-formed insulation module comprising an inner insulation layer, an outer insulation layer, a water vapor barrier layer and a cladding layer distinct from the water vapor barrier layer. Support for this amendment may be found in the application on page 4, lines 5-6, which state, "At least one water vapour barrier layer may be disposed between the cladding and a polymeric foam insulation layer". Such a water vapor barrier layer is shown in Figure 11 and numbered as 319.

In contrast, Kikuchi teaches only a cladding layer surrounding the insulating layers and does not teach or suggest a distinct water vapor barrier layer. Thus, Kikuchi fails to teach all claim elements recited in Claim 1 and, therefore, cannot properly support a rejection of this claim on the basis of anticipation.

Furthermore, it would not be obvious for one of ordinary skill in the art to modify Kikuchi by adding a water vapor barrier layer because there is no motivation for one to do so. One of the three criteria necessary to establish a *prima facie* case of obviousness is that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference teachings. (MPEP, Section 2143, Page 2100-122.) As the Examiner points out on page 5 of the Action, the cladding layer used in Kikuchi inherently functions as a water vapor barrier layer. Thus, by the teachings of Kikuchi, there would be no perceived need (i.e., no motivation) to incorporate a separate and distinct layer to act as a water vapor barrier since the cladding layer already performs this function. However, a separate water vapor barrier beneath the cladding layer, as taught by the applicant and recited in Claim 1, provides additional protection against ingress of water vapor which becomes important, especially for cryogenic applications where ambient water vapor condenses rapidly on cold surfaces to compromise the insulation of the component and form undesired ice thereon. While the cladding layer can be an effective vapor barrier, it is exposed to the ambient and thus subjected to puncture, abrasion and corrosion damage which compromise its function as a vapor barrier. Having at least one vapor barrier layer distinct from the cladding layer as recited in Claim 1 provides protection even when the cladding layer fails.

Claims 2-4, 16 and 24-26 are dependent, either directly or indirectly, on Claim 1 and should be allowable over Kikuchi for the same reasons that Claim 1 is allowable.

Rejections under 35 USC 103

Claims 14, 15, 17, 18, and 27-29 are rejected under 35 USC 103 as obvious over Kikuchi or Kikuchi in view of Villain

et al. However, one of the three criteria necessary to establish a *prima facie* case of obviousness requires that the prior art reference or references when combined, must teach or suggest all the claim limitations. (MPEP, Section 2143, Page 2100-122.) Claims 14, 15, 17, 18 and 27-29 are all dependent upon Claim 1. As such, all of these dependent claims incorporate all of the limitations of Claim 1, including the vapor barrier layer distinct from the cladding layer as recited in that claim. Neither Kikuchi nor Villain et al teaches or suggests such a distinct vapor barrier as recited in the claim, and it has already been shown above that adding such a barrier would not be obvious in view of Kikuchi. By analogy with Kikuchi, it would also not be obvious to add such a vapor barrier in view of Villain et al since this reference also teaches a cladding layer of metal or plastic which inherently acts as a vapor barrier.

Thus, the combination of Kikuchi and Villain et al fail to teach all claim limitations of the rejected claims, i.e., the cited references fail to teach a preformed insulation module having a distinct water vapor barrier layer. The references further provide no motivation to add such a layer. Because all claim limitations are not taught or suggested, and there is no motivation to modify the references as required to include the missing limitation, the cited references fail to meet the requirements necessary to establish a *prima facie* case of obviousness. The cited references cannot, therefore, properly support rejection of Claims 14, 15, 17, 18, and 27-29 on the basis of obviousness. Applicant respectfully requests that the rejection be withdrawn and the claims be allowed.

Summary

Applicant has demonstrated by the arguments presented above that the amended claims are enabled by the disclosure, are not indefinite and are neither anticipated nor obvious in

view of the cited references. Applicant respectfully contends that the claims, as amended, are allowable and requests that all rejections be withdrawn and the application passed to issue.

Respectfully submitted,

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Version with Markings to Show Changes Made

1 (amended). A pre-formed insulation module for insulating a process component having opposed longitudinally extending contacting surfaces extending along a length thereof and terminal contacting surfaces at each end thereof comprising:

(a) at least one first inner insulation layer being constituted of an insulation material having [suitable] a capacity to withstand thermal shock [characteristic] under cryogenic conditions and having one surface proximate to a surface of a component to be insulated[,];

(b) at least one second outer insulation layer disposed radially outwardly of said inner insulation layer;

(c) at least one water vapour barrier layer; and

(d) a cladding layer distinct from said at least one water vapour barrier layer.

2 (amended). The module of claim 1 including connection means for connecting said module to [a further] an adjacent [such] module for insulating said component.

4 (amended). The module of claim 3 wherein said circumferentially disposed connection means are formed in the terminal contacting surfaces and the longitudinally disposed connection means are formed in said longitudinally extending contacting surfaces.

16 (amended). The module of claim 1 wherein said inner insulation layer is formed from a first insulation material and said outer insulation layer[s are] is formed from a second insulation material[s] said first insulation material having different thermal shock characteristics from those of said second insulation material.

24 (amended). The module of claim 2 wherein said inner insulation layer is formed from a first insulation material and said outer insulation layer[s are] is formed from a second insulation material[s] said first insulation material having different thermal shock characteristics from those of said second insulation material.

25 (amended). The module of claim 3 wherein said inner insulation layer is formed from a first insulation material and said outer insulation layer[s are] is formed from a second insulation material[s] said first insulation material having different thermal shock characteristics from those of said second insulation material.

26 (amended). The module of claim 4 wherein said inner insulation layer is formed from a first insulation material and said outer insulation layer[s are] is formed from a second insulation material[s] said first insulation material having different thermal shock characteristics from those of said second insulation material.